AHW-101A InSb Hall Element

- Ultra High-sensitivity InSb Hall element
- Classic SOT Package
- Shipped in packet-tape reel (3000pcs per reel)

Absolute Maximum Rating

Item	Symbol	Conditions	Limit	Unit
Operating Temperature Range	T_{opr}		-40 ~ +125	℃
Storage Temperature Range	T_{STG}		-55 ~ +150	℃
Maximum Input Current	I_{cmax}	T_a = 25℃	20	mA
Maximum Input Voltage	V_{cmax}	T_a = 25℃	2	V

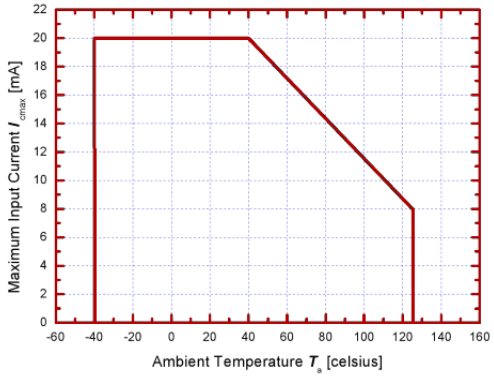


Figure 1. 2 Maximum input Current I_{cmax}

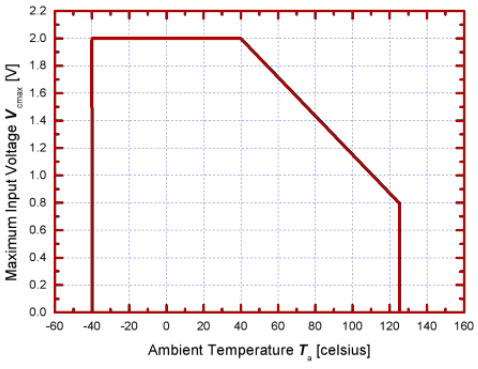
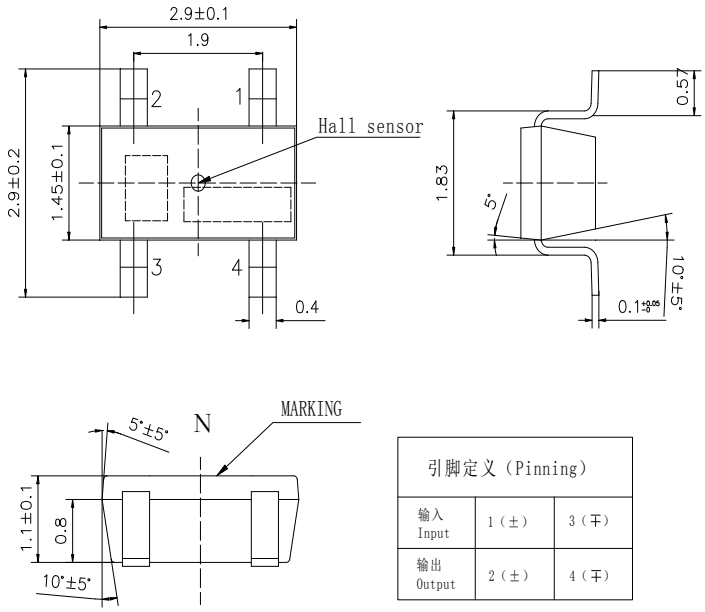


Figure 1. 2 Maximum input Voltage V_{cmax}

Dimensional Drawing (Unit: mm)



Electrical Characteristics （RT=25℃）

Table 1. Electrical Characteristics of AHW-101A

Item	Symbol	Test Condi.	Min.	Typ.	Max.	Unit
Hall Voltage	V_H	B = 50mT, V_c=1V T_a = RT	168		516	mV
Input Resistance	R_{in}	B = 0mT, I_c = 0.1mA T_a = RT	240		550	Ω
Output Resistance	R_{out}	B = 0mT, I_c = 0.1mA T_a = RT	240		550	Ω
Offset Voltage	V_{os}	B = 0mT, V_c = 1V T_a = RT	-5		+5	mV
Temp. Coeffi. of V_H	α V_H	B = 50mT, I_c =5mA, T_a = 0℃ ~ 40℃		-1.8		%/℃
Temp. Coeffi. of R_{in}	α R_{in}	B = 0mT, I_c =0.1mA, T_a = 0℃ ~ 40℃		-1.8		%/℃
Dielectric strength		100V D.C	1.0			MΩ

Note:

1. $V_H = V_{H-M} - V_{os}$

   In which V_{H-M} is the Output Hall Voltage, V_H is the Hall Voltage and V_{os} is the offset Voltage under the identical electrical stimuli.

2. $\alpha V_H = \frac{1}{V_H(T_1)} \times \frac{V_H(T_3) - V_H(T_2)}{(T_3 - T_2)} \times 100$ $T_1 = 20℃, T_2 = 0℃, T_3 = 40℃$

3. $\alpha R_{in} = \frac{1}{R_{in}(T_1)} \times \frac{R_{in}(T_3) - R_{in}(T_2)}{(T_3 - T_2)} \times 100$ $T_1 = 20℃, T_2 = 0℃, T_3 = 40℃$

Classification of Output Hall Voltage (V_H)

Table 2. Classification of Hall Voltage

Rank	V_H [mV]	Conditions
C	168 ～ 204	B=50mT, V_C=1V
D	196 ～ 236	
E	228 ～ 274	
F	266 ～ 320	
G	310 ～ 370	
H	360 ～ 415	
I	405 ～ 465	
J	454 ～ 516	

Characteristic Curves

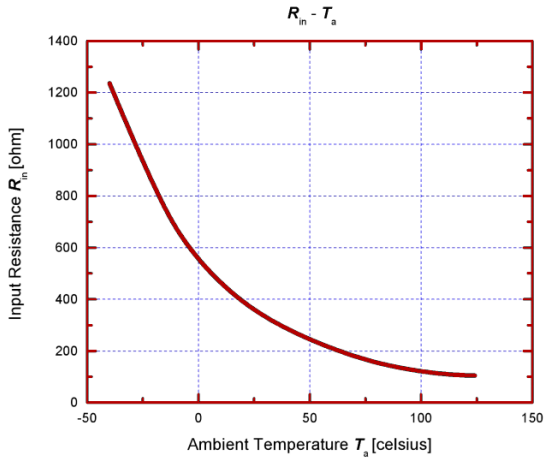


Figure 2. Input resistance R_{in} as a function of ambient temperature T_a.

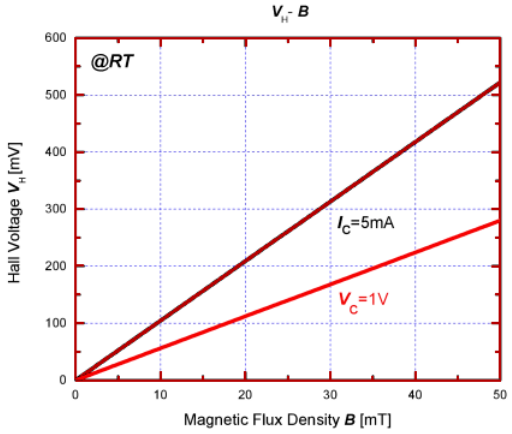


Figure 3. Hall voltage V_H as a function of magnetic flux density B.

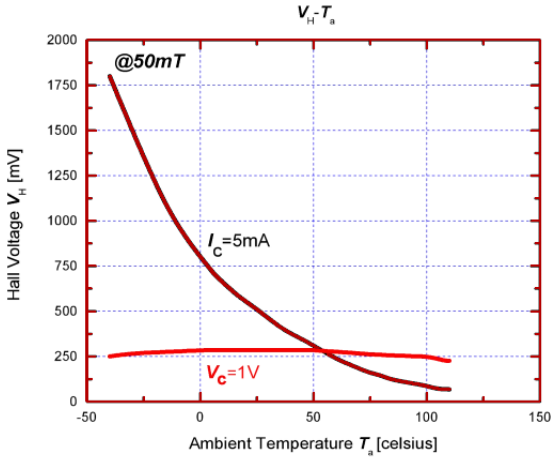


Figure 4. Hall voltage V_H as a function of ambient temperature T_a.

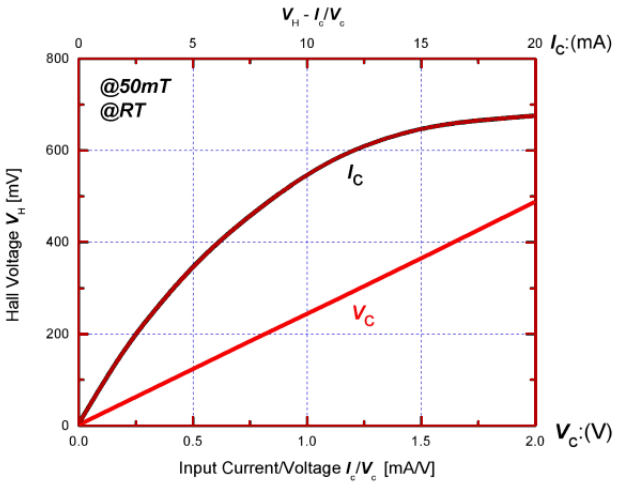


Figure 5. Hall voltage V_H as a function of electrical stimuli I_C/V_C.

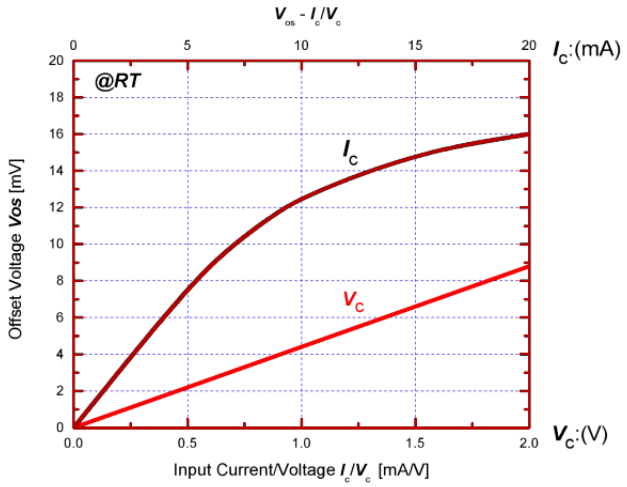


Figure 6. Offset voltage V_{os} as a function of electrical stimuli I_c/ V_c.

Reliability Test Terms

Table 2. Reliability Test Terms, Conditions and Duration.

No.	Terms	Conditions	Duration
1	High Temperature Storage (HTS)	【JEITA EIAJ ED-4701】 T_a =150（0 ~ +10）℃	1000 hrs
2	Heat Cycle (HC)	【JEITA EIAJ ED-4701】 T_a=-55℃~150 ℃ high temp. - normal temp. - low temp. 30 min - 5 min - 30 min	30 cycles
3	Temp. Humidity Storage (THS)	【JEITA EIAJ ED-4701】 T_a =85±3 ℃, R_H =85±5 %	1000 hrs
4	Reflow Soldering (RS)	【JEITA EIAJ ED-4701】 260±5 ℃	10 sec
5	High Temp. Operating (HTO)	T_a =125 ℃, V_c =1V	1000 hrs

Criteria:

- Variation of Hall Voltage V_H and input/output resistances $R_{in/out}$ are less than 20%.
- Variation of offset voltage V_{os} is less than ±16mV.
- Other parameters in **Table 1.** are still within their ranges stated in **Table 1.**

Soldering Conditions

The following conditions should be preserved. Solder ability should be checked by yourself, because it is depend on solder paste material and other parameters.

Material of solder flux

- Use the resin based flux and refrain from using organic or inorganic acid based and water-soluble one.

Cleansing of solder flux conditions

- Use Ethanol or Isopropyl alcohol as cleansing material.
- Process temperature should be 50 ℃ or less.
- Duration should be 5 minutes or less.

Hand soldering conditions

- Apart from the mold resin more than 1mm.
- Solder at temperature 300 ℃ for less than 5s.

Wave soldering conditions

- Temperature in Pre-heating zone should be lower than 150℃.
- Temperature in Soldering zone should be lower than 270℃.

Precautions for ESD

This product is the device that is sensitive to ESD (Electrostatic Discharge). Handling Hall Elements with the ESD-Caution mark under the environment in which

- Static electrical charge is unlikely to arise (Ex: Relative Humidity over 40%RH).
- Wearing the anti-static suit and wristband when handling the devices.
- Implementing measures against ESD as for containers that directly touch the devices.

Precautions for Storage

- Products should be stored at an appropriate temperature and humidity (5° C to 35° C, 40%RH to 60%RH) after the unsealing of the MBB. Keeping products away from chlorine and corrosive gas.
- **For storage longer than 2 years**

  Products are sealed in MBB with a desiccant. It is recommended to store in nitrogen atmosphere with MBB sealed. Oxygen and H_2O of atmosphere oxidizes leads of products and lead solder ability get worse.

Precautions for Safety

- Do not alter the form of this product into a gas, powder or liquid through burning, crushing or chemical processing.
- Observe laws and company regulations when discarding this product.